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Washington, D. C. 20024

date: December 27, 1971

to: Distribution

B71 12017

from: R. A. Bass, K. E. Martersteck, G. S. Taylor, S. C. Wynn

subject: Computer-Generated Panoramas of the Descartes Terrain from Various Traverse Stops -- Case 310

ABSTRACT

Computer-generated panoramas of the viewable terrain from the Descartes landing site and three sites on the traverses display the undulating surface that the astronauts will encounter in the Descartes region. Significant horizon features that are seen in all views are Stone Mountain and a sharp peak that lies southwest of Stone Mountain. Additionally, a large peak lying northwest of the Smoky Mountain may aid the astronauts in finding North Ray Crater.

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MEMORANDUM FOR FILE

Computer-generated panoramas of the Descartes terrain viewable by an astronaut standing at the landing site, at Station 6 on the side of Stone Mountain, at Station 8 near Stubby Crater, and at Station 13 near North Ray crater are presented. These scenes were generated by processing a digitized form of the U. S. Army TOPOCOM compilation of the terrain contours in the Descartes landing area. Actually two data bases are used: a 1:25,000 scale map of the 12 by 14 kilometer area roughly centered on the landing site with data points every 6.35 meters provides close-in detail. Far field data are taken from a 50 by 60 kilometer 1:100,000 scale base map (data points every 25.4 meters) surrounding the 1:25,000 data. The computer program determines the points visible from a given observer's eye position and generates a perspective plot of these visible points connected by lines of constant longitude and latitude. In the foreground out to 200 meters from the observer, the terrain features are depicted with 5 by 5 meter grid lines; from 200 meters to the horizon a 50 by 50 meter grid is used. The darkening of distant features is caused by a high density of grid lines and does not indicate relative brightness of the features.

The sections of each scene can be connected to form a 360° panoramic view. It should be noted that when viewing a 360° pan view which is lying flat, most features (particularly those lying near the horizon) appear further away than they would when viewing the actual scene. Ideally, the 360° pan should be connected to form a cylinder and viewed from within.

Tables I through IV list the azimuth, range and altitude of significant features appearing in each scene.

View from the Landing Site (Figure 1)

Stone Mountain lying to the southeast of the landing site will be the dominant identifiable feature visible by the astronauts as they stand on the lunar surface near the LM. Two

other prominent mountain tops appear to the west of Stone Mountain. At a bearing of 218° is a flat-topped peak which is 11.3 kilometers away. The higher and sharper peak seen at 190° is a distance of 11.2 kilometers from the landing site and rises to an altitude of 470 meters above the LM site altitude.

In other directions of view, significant features apparently will not be evident. To the north, most of Smoky Mountain will be obscured by a nearby ridge. Only the upper reaches of Smoky appear between 6° and 8° azimuth. To the east and west no readily recognizable landmarks are apparent. Thus, unless the heading of the LM after landing is greater than ten degrees away from due west, no significant features will be observable from the LM windows to help in locating the actual touchdown location.

View from side of Stone Mountain (Figure 2)

The second set of panoramas display the view from Station 6 on the side of Stone Mountain. The terrain viewable between 220° and 45° should provide a dramatic view of the Descartes region. At 300° a three-crater chain, of which the first two craters are Stubby and Wreck, is evident. The LM should appear at about 351°. Smoky Mountain is seen to the north. The views in other directions are blocked by the side of Stone Mountain.

An apparent distant cliff at 322° is the result of a mismatch at the interface between the two data bases and is not a real physical feature.

View from Stubby Crater (Figure 3)

The third set of panoramas shows the view from Station 8 near Stubby Crater. Between 185° and 310° Stubby Crater can be seen in the foreground. Two distant peaks that were viewable from the LM site can be seen at a bearing of 227° and 190° respectively. The higher levels of Smoky Mountain can be seen at 10°. The sharper peak at about 2° is northwest of Smoky Mountain and at a distance of 13.8 kilometers from the observer position. Toward the west and southwest, Stone Mountain will dominate the view.

View from North Ray Crater (Figure 4)

The last view presented is from Station 13 which is on the south side of North Ray Crater. The positioning of the observer at this station is very sensitive due to a ridge that exists in this region. The attached view is generated from slightly south of this ridge thereby preventing a view into the

crater itself. However, in the northern portion of the view between 340° and 20° the downhill slope into the crater is seen. At 5° a sharp-peaked mountain is the dominant feature. Between 15° and 68°, the lower levels of Smoky Mountain can be seen. To the south, Stone Mountain and the two aforementioned peaks are evident.

A characteristic of the region around North Ray that is evident from the scene is the large number of ridges that will obscure the view of the crater until the astronauts are actually on the lip. The sharp-peaked mountain appearing to the northwest of Smoky Mountain could be used as a landmark to aid in keeping a constant northerly direction until the crater is reached.

R. A. Bass

K. E. Martersteck

G. S. Taylor

S. C. Wynn

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Attachments
Tables I thru IV
Figures 1 thru 4

TABLE I

AZIMUTH AND RANGE TO SIGNIFICANT

FEATURES FROM LANDING SITE

AZIMUTH	RANGE	ALTITUDE OF HIGHEST VISIBLE POINT* (METERS)	FEATURE
0°-6°	100 METERS	15	RIDGE
6°-8°	6 KM	487	SMOKY MOUNTAIN
8°-90°	70 METERS	15	RIDGE
100°-185°	5.3 KM	503	STONE MOUNTAIN
190°	11.2 KM	469	SHARP PEAK
216°-222°	11.3 KM	63	FLAT-TOPPED MOUNTAIN
320°-6°	100 METERS	15	RIDGE

TABLE II

AZIMUTH AND RANGE TO SIGNIFICANT FEATURES

FROM THE SIDE OF STONE MOUNTAIN (STATION 6)

AZIMUTH	RANGE	ALTITUDE OF HIGHEST VISIBLE POINT* (METERS)	FEATURE
0°-28°	10.5 KM	500	SMOKY MOUNTAIN
45°-210°	----	---	STONE MOUNTAIN
233°-241°	9.4 KM	63	FLAT-TOPPED MOUNTAIN
280°-305°	1.2 KM	---	STUBBY CRATER
292°-315°	2.2 KM	---	WRECK CRATER
351°	3.93 KM	---	LM LANDING SITE
354°-359°	14.5 KM	613	SHARP PEAK

*ABOVE LANDING SITE ALTITUDE

TABLE III

AZIMUTH AND RANGE TO SIGNIFICANT FEATURES

FROM STUBBY CRATER (STATION 8)

AZIMUTH	RANGE	ALTITUDE OF HIGHEST VISIBLE POINT* (METERS)	FEATURE
0°-4°	13.8 KM	615	SHARP PEAK
5°-17°	9.6 KM	493	SMOKY MOUNTAIN
90°-180°	.8 KM	493	STONE MOUNTAIN
185°-310	----	---	STUBBY CRATER
190°	8.1 KM	469	SHARP PEAK
226°-232°	8.6 KM	63	FLAT-TOPPED MOUNTAIN

*ABOVE LANDING SITE ALTITUDE

TABLE IV

AZIMUTH AND RANGE TO SIGNIFICANT FEATURES

FROM NORTH RAY CRATER (STATION 13)

AZIMUTH	RANGE	ALTITUDE OF HIGHEST VISIBLE POINT* (METERS)	FEATURE
4°-10°	6.3 KM	615	SHARP PEAK
15°-68°	1.1 KM	472	SMOKY MOUNTAIN
160°-180°	8.3 KM	493	STONE MOUNTAIN
185°	15.6 KM	464	SHARP PEAK
205°-210°	14.8 KM	63	FLAT-TOPPED MOUNTAIN
340°-20°	~20 METERS	NOT VISIBLE	NORTH RAY

*ABOVE LANDING SITE ALTITUDE

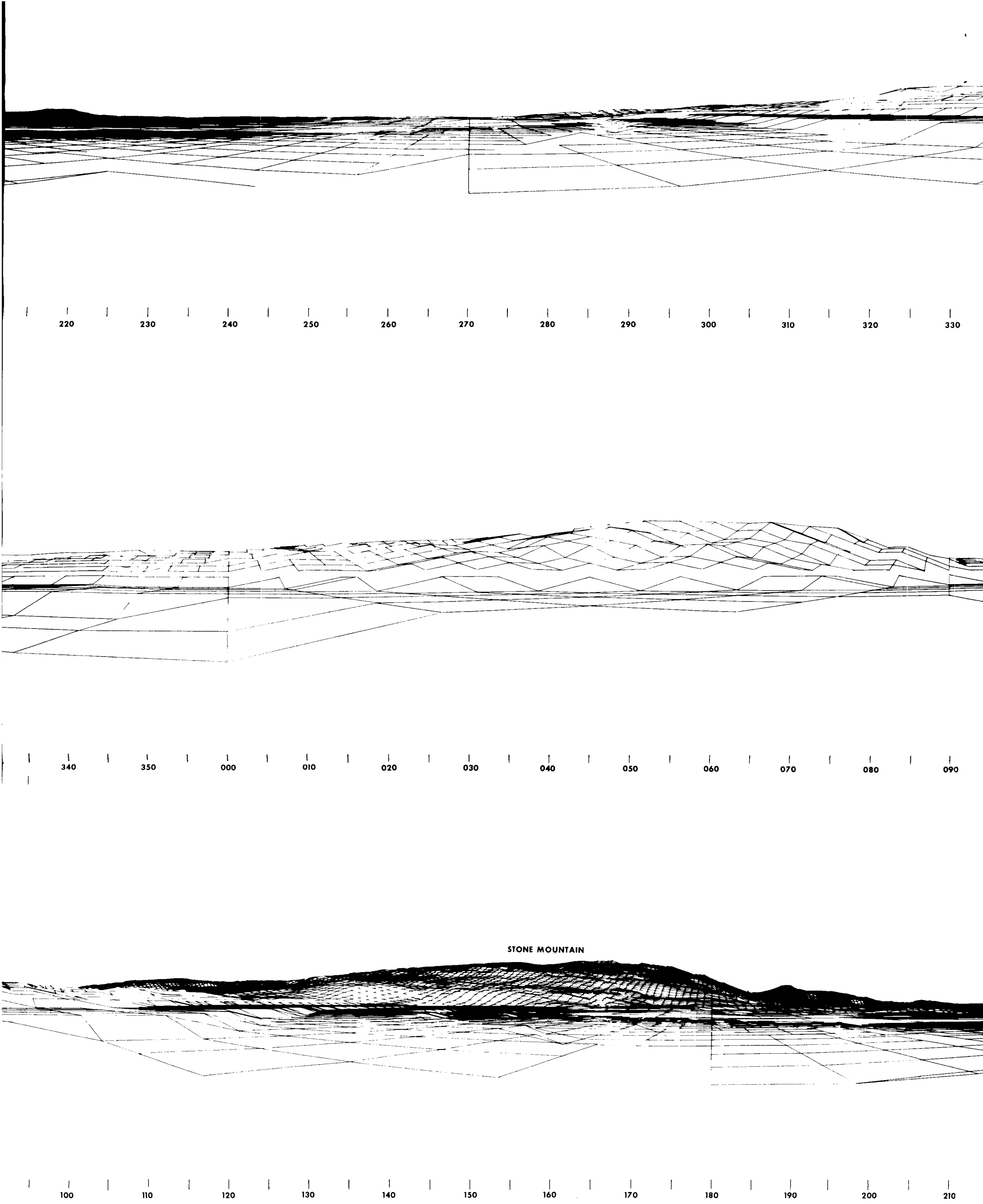

FIGURE 1 - VIEW FROM LANDING SITE

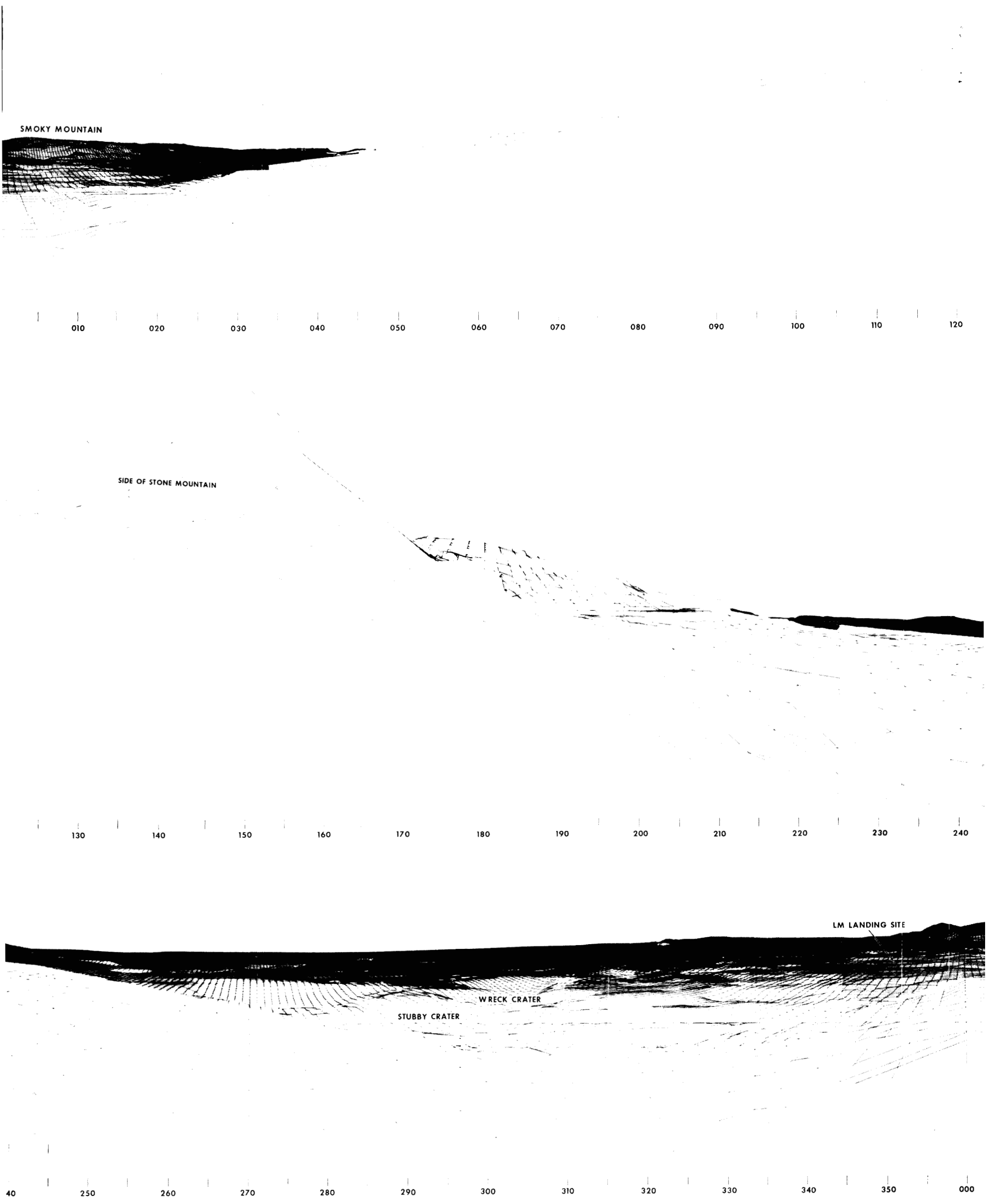

FIGURE 2 - VIEW FROM THE SIDE OF STONE MOUNTAIN (STATION 6)

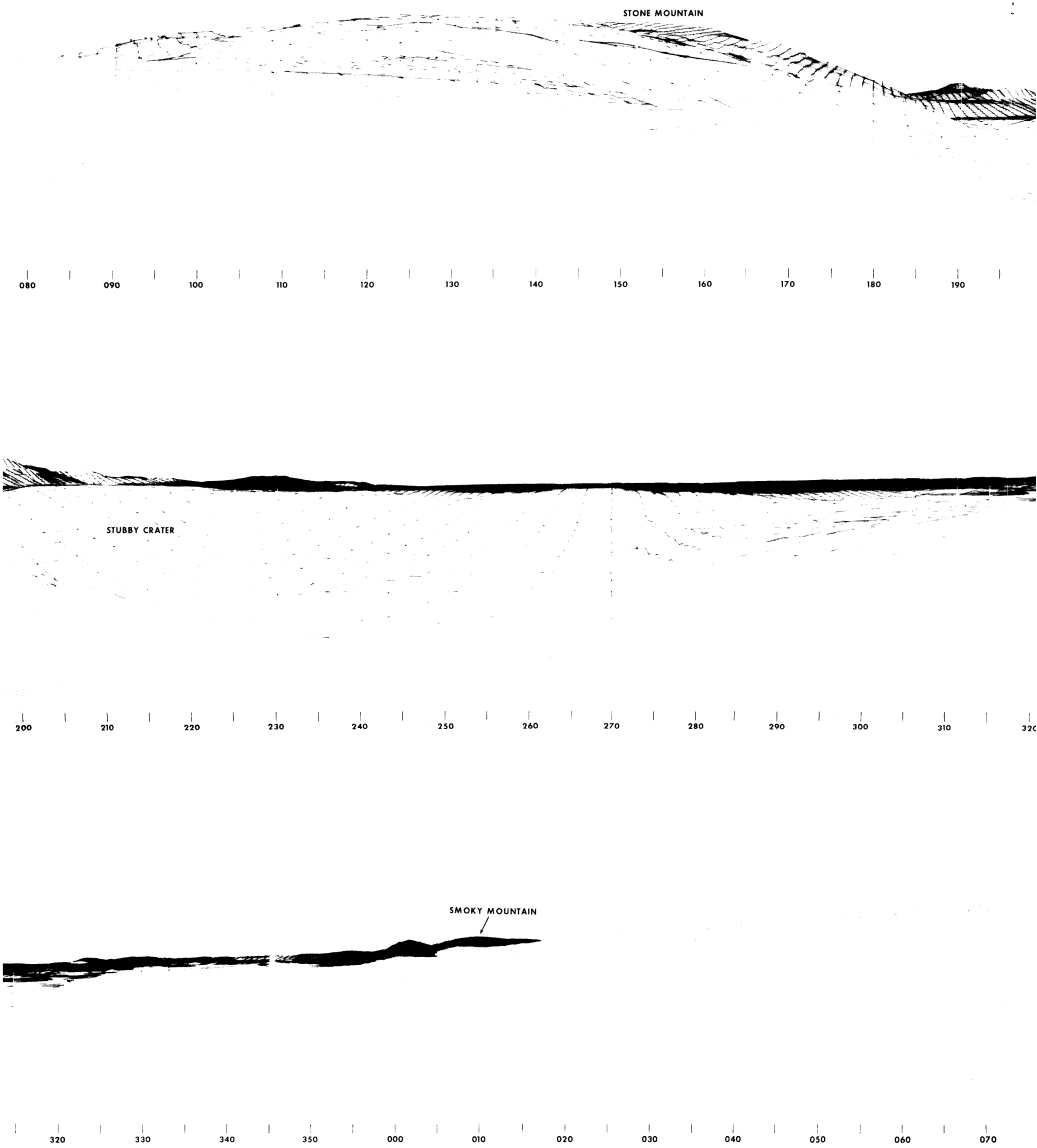

FIGURE 3 - VIEW FROM STUBBY CRATER (STATION 8)

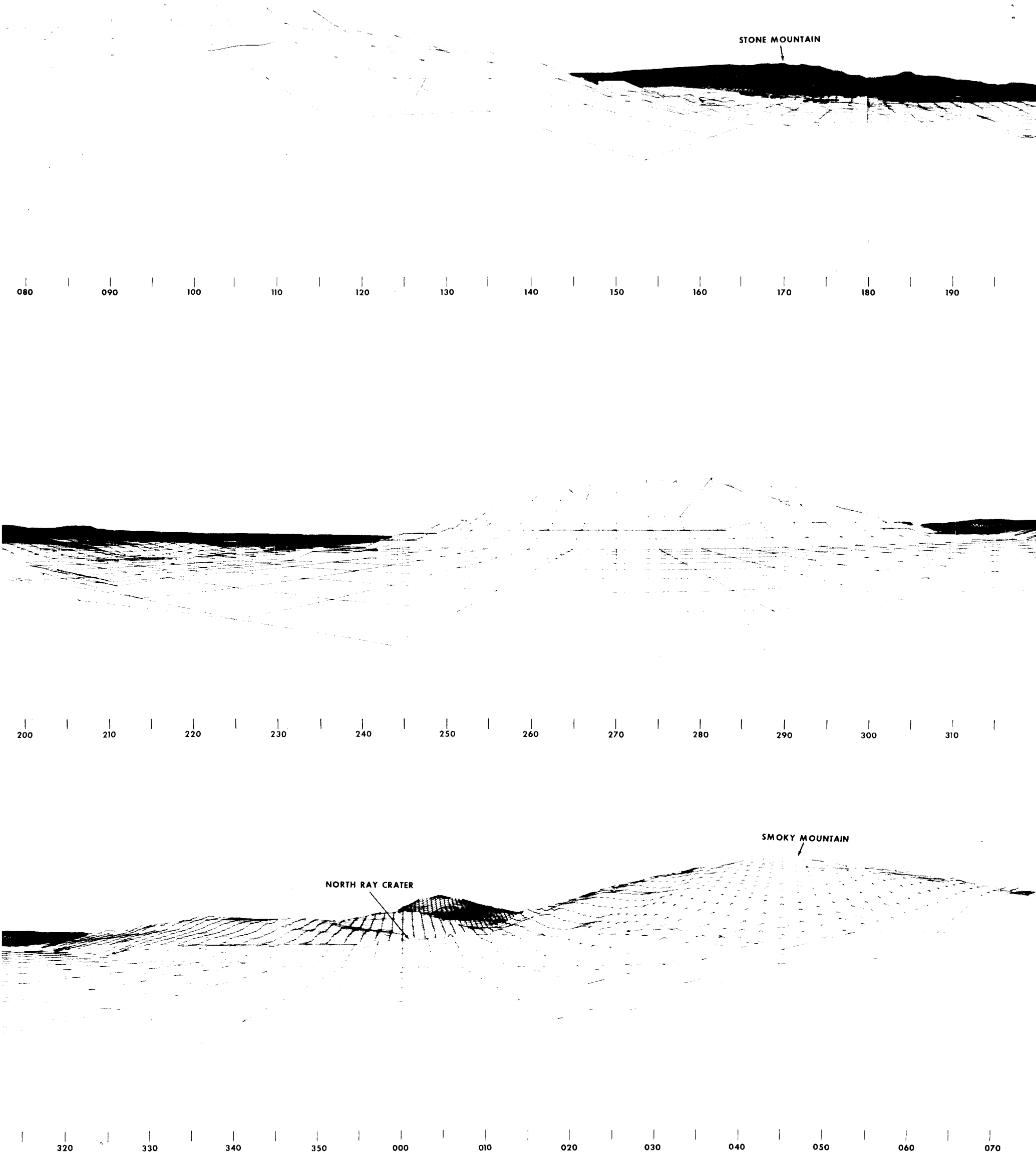

FIGURE 4 - VIEW FROM REGION OF NORTH RAY CRATER (STATION 13)

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